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FOUR NEW SAWFLIES FROM EASTERN NORTH AMERICA, THREE SPECIES OF *TENTHREDO* AND ONE OF *DOLERUS* (HYMENOPTERA: TENTHREDINIDAE)

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Abstract.—Three new species of *Tenthredo* and one new *Dolerus* from eastern North America are described and illustrated. *Tenthredo appalachia* and *T. masneri* occur from southern Canada to Great Smoky Mountains National Park in North Carolina and Tennessee. *Tenthredo fernowi* is more restricted and is known only from northern Virginia and West Virginia to Great Smoky Mountains National Park. Though rarely previously collected, adults of these three species are common in collections from a broadleaf forest in West Virginia. *Dolerus klokeorum* was discovered in collections from three localities in the Virginia Piedmont. Flight records and habitat data are given for each species.

Key Words: *Dolerus,* North America, sawflies, Tenthredinidae, *Tenthredo*

Four sawflies are described here so that names will be available for future papers on sawfly studies in the mid-Atlantic states. The three species of *Tenthredo* are relatively common in collections from within a broadleaf forest of the central Appalachians of West Virginia. The *Dolerus* is from Virginia, and it is an addition to the revision of nearctic *Dolerus* (Goulet 1986).

Most specimens of the three *Tenthredo* species were collected during a study of non-target insects and diflubenzuron (E. M. Barrows, Georgetown University) in a broadleaf forest in the central Appalachians, the Fernow Experimental Forest, Monongahela National Forest, about three miles south of Parsons, Tucker Co., West Virginia (39°3′N, 79°40′W; map in Griffith and Perry 1992). The forest is dominated by oaks, intermixed primarily with beech, sweet birch, maple, yellow poplar (tulip tree), black cherry, pin cherry, white ash, basswood, rhododendron, and black locust (Anonymous 1987). Elevations of the collection sites vary between 2300 to 2600 feet. Twenty Townes-style Malaise traps were utilized, five in each of four watersheds, for the non-target study, and all were in operation from mid-April to the end of September each year. In each watershed, one trap was adjacent to a stream, two traps were about 20 m up each slope, and another 2 traps were about 40 m up each slope. All were within dense forest. The Malaise trap numbers in the specimen data sections indicate the watershed-trap number, e.g. 4-1 is watershed 4, trap 1, etc. Trap 1 was the top trap on the northerly-facing slope, trap 2 the middle trap on this slope, trap 3 near a stream, trap 4 the middle trap on the southerly-facing slope, and trap 5 the top trap on this slope. Trap numbers of 6 or higher are Cornell-style Malaise traps set up at forest edges.

Much of the terminology, especially for

sculpturation, is based on Goulet (1986). Format and terminology are consistent with that being used for ongoing revisionary studies of Nearctic *Tenthredo* by the senior author. The character choice in descriptions is a function of species closely related to the one being described. *Tenthredo appalachia,* n. sp., and *T. masneri,* n. sp., are closely related, and their descriptions are similar. *Tenthredo fernowi,* n. sp., is related to *T. rufopecta* (Norton), *T. nimbipennis* Cresson, and *T. mellicoxa* Provancher, and its description stresses characters significant among these species.

Tenthredo appalachia Goulet and Smith, New Species (Figs. 1, 4, 9)

Diagnosis.—Adults are distinguished from those of other Nearctic species of *Tenthredo* with minute pulvilli (length of pulvillus of first metatarsomere 0.15–0.20 × length of second metatarsomere) and with microsculpture on the mesonotal median lobe by the following character combination: ventral portion of metasternum completely orange, clypeus white (except on basal one-fourth to one-third), and tergites 2–8 not appreciably paler along posterolateral margin.

Female.—Length, 10.5–12.0 mm. Antenna and head black, with apical ⅔ clypeus, mandible, labium, and maxillary and labial palpi white; minute white spot present on lower outer orbit (may be lacking) and one on upper inner orbit. Thorax black with tegula, spot on lower posterior margin of mesepisternum near mesocoxa, and metepisternum white; posteromedial portion of pectus orange. Abdomen black with lateral margin of tergite 1 white and basal sternite and sometimes part of sternite 2 orange. Legs orange with apical ⅔ of metatibia and metatarsus black. Wings hyaline; veins and stigma black.

Head in dorsal view slightly narrower behind eyes (maximal distance between outer margins of eyes 1.05× maximal distance between outer margins of gena). Antennal flagellum long: sixth flagellomere 4× longer than wide and first flagellomere 1.10–1.20× as long as second flagellomere. Head and body mostly shining and impunctate, with thorax more dulled by surface sculpture than head. Malar area near mandible with convex sculpticells and fine punctures (10–15 μm in diameter); central portion of gena with lightly imprinted meshes of microsculpture; remainder of head smooth. Mesepisternal spine obtusely angular (about 130°, Fig. 9). Most of thorax with fine surface microsculpture, with rugose microsculpture on posterior half of mesepisternum, and without microsculpture on medial portion of posttergite, on lateral lobe of mesoscutum, and anterior half of mesoscutellum. Punctures on pectus and on mesoscutum fine (10–15 μm in diameter), 20–30 μm apart on median lobe and pectus, and 10–40 μm apart on lateral lobe; punctures of mesoscutellum larger (30 μm in diameter) and 30–60 μm apart. Abdomen shining but with fine surface microsculpture, meshes of microsculpture about 10 μm in length by 15–60 μm in width, posterior margin of sculpticells clearly elevated and scale-like. Setae lacking at base of tergite 1. Pubescence developed over half of tergite 7, and dense on tergites 8–9, 40–50 μm apart. Tarsal pulvilli minute (length of pulvillus of first metatarsomere 0.15–0.18× length of second metatarsomere) and narrow (width of pulvillus of first metatarsomere about ⅓ apical width of second metatarsomere) (Fig. 4). Serrulae of lancet as in Fig. 1.

Male.—Length, 10.0 mm. Similar in coloration to female except for the following: gena with large white spot on lower third; pronotum in lateral view with white spot on ventral surface; mesepisternum black with white spot extended from mesocoxa forward beyond middle, ventral portion of pectus black anteriorly but gradually becoming orange in posterior half; tergites 1–8 dark brown but white at side of tergite 1

and whitish on medial half of tergites 2–5; sternites 2–5 whitish orange.

Head in dorsal view clearly narrower behind eyes (maximal distance between outer margins of eyes 1.14× maximal distance between outer margins of gena). Setae at base of tergite 1 present only at side and medially. Metatarsus in dorsal view narrow as in female; metatarsomere 2 about 6× longer than wide. Genitalia as in Fig. 6; penis valve with apical spine.

Holotype.—Female, labeled "West Virginia: Tucker Co., Fernow Expt. Forest, 31-V–9-VI-91, E.M. Barrows," "Malaise trap 7-2." Deposited in the National Museum of Natural History, Washington, D.C.

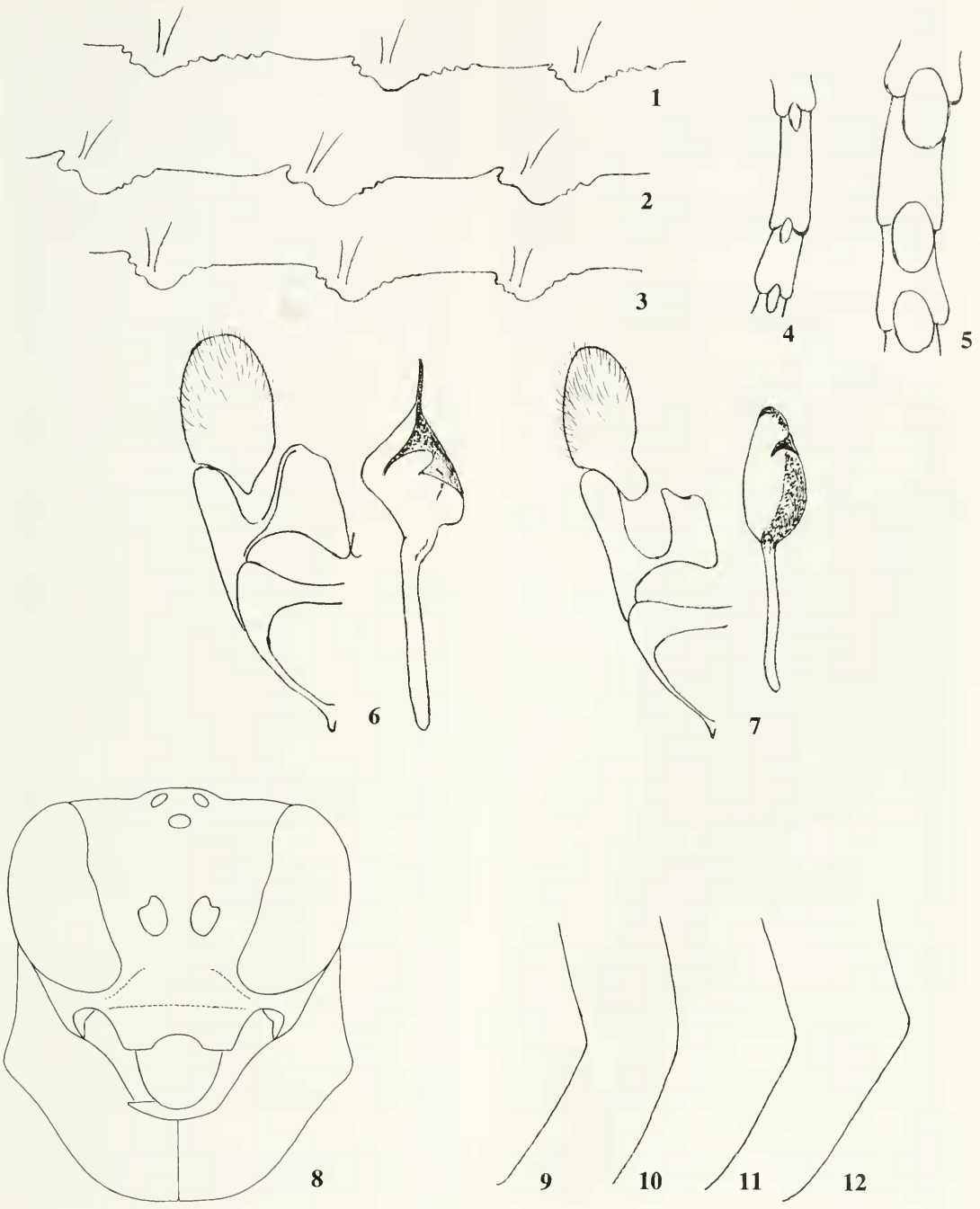
Paratypes (14 F, 1 M).—CANADA: QUEBEC: Knowlton, 1-VII-36 (1M). U.S.A.: NEW HAMPSHIRE: Lancaster, Mount Prospect, 19-VI-82 (1F). NORTH CAROLINA/TENNESSEE: Great Smoky Mts. Natl. Park, 8-VII-57 (2F). WEST VIRGINIA: Same data as holotype except for dates and trap numbers, 10–19-VI-91, trap 1-2 (1F); 20–29-VI-91, trap 1-3 (1F); 21–30-V-91, trap 4-1 (1F); 10–19-VI-91, trap 4-2 (1F), trap 4-6 (1F), trap 7-6 (1F); 10–19-VII-91, trap 13-3 (1F); 20–29-V-92, trap 1-2 (1F), trap 7-6 (1F), trap 13-6 (1F); 19-V–28-VI-92, trap 7-6 (1F). Deposited with the holotype and in the Canadian National Collection, Ottawa.

Distribution.—This species occurs in the Appalachian Mountains from Great Smoky Mountains National Park northwards to southernmost Quebec.

Etymology.—The specific epithet is a noun in apposition and refers to the Appalachian Mountain range distribution of this species.

Discussion.—Females of *T. appalachia* have a mostly black body with orange legs except for the black apical one- to two-thirds of the metatibia and the metatarsus. This color pattern is very similar to those of *T. leucostoma* Kirby and other similarly colored species with an angular mesepisternal spine. The male is rather different in color pattern from those of *T. leucostoma* and similarly colored species. Females of *T. leucostoma* and similarly colored species are differentiated from *T. appalachia* as follows: pulvilli very long and wide (length of pulvillus of first metatarsomere 0.40–0.70× length of second metatarsomere; width of pulvillus of first metatarsomere about two-thirds that of second metatarsomere) (Fig. 5); ventral portion of metepisternum black or black with white on posterior half; posterior margin of pronotum white or black, apical one- to two-thirds of metatibia black; and head slightly duller because of surface sculpture, especially on hindorbits. The male of *T. leucostoma* and of species alluded to above have black stripes or spots on the coxae, trochanters, and femora. From *T. masneri,* its closest species, *T. appalachia* is distinguished by the black posterior margin of the pronotum in dorsal view, black posterolateral margin of tergites 2–8, black posterior margin of tergite 1, wider black base of clypeus, longer antennal flagellum (sixth flagellomere 4× longer than wide), smaller pulvilli, and lack of setae over at least portion of base of tergite 1.

This species is part of the lineage to which most North American *Tenthredo* species belong. The following species groups proposed by Ross (1951) and followed by Smith (1979) belong in this lineage: *basilaris, pectoralis, rufopecta* (only *T. rurigena* MacGillivray), *angulifera, leucostoma* (excluding *nimbipennis*), *occidentalis, verticalis, semirufa, secunda, xantha,* and *begimina.* This lineage is characterized as follows: metatibial spurs less sharp than those of mesotibiae; penis valve with short, straight, ventroapical spur; and tergites 7–10 or 8–10 of female completely or almost completely pubescent (except *T. fernaldii* MacGillivray, fully pubescent from tergite 2). Except for species of the *pectoralis* group, species in other groups are often difficult to associate together in groups because character states (other than color pattern) have not been discovered. However, adults of *T.*



Figs. 1–12. Central serrulae of lancet of 1, *Tenthredo appalachia*; 2, *T. masneri*; 3. *T. fernowi*. Metatarsal pulvilli of 4, *T. appalachia*; 5, *T. leucostoma*. Male genitalia of 6, *T. masneri*; 7, *T. fernowi* (ventral view of half of genital capsule on right, lateral view of penis valve on left). Mesepisternal angle (posterior view) of 8, *T. masneri* (showing head and thorax in anterior view); 9, *T. appalachia*; 10, *T. fernowi*; 11, *T. mellicoxa*; 12, *T. rufopecta*.

appalachia and *T. masneri* are the only ones with an orange metepisternum on the ventral surface and with minute pulvilli. The color pattern of the legs and body of the male (coxae, trochanters, basal two-thirds of femora orange or whitish orange, tergites brown except medially on tergites 3–5) supports this proposed relationship. Large pulvilli are seen in the earliest lineages of *Tenthredo* as well as in other genera of the Tenthredinini; therefore, small pulvilli are a departure from the ground plan, which probably evolved several times in *Tenthredo,* especially in species of most Eurasian groups. Elongation of the flagellum is usually associated with reduction in size of the pulvilli. The lineage to which *T. appalachia* belongs seems to be very rare in Eurasia. Only *T. procera* Klug with a short spur on the penis valve seems to be related. Otherwise, the putative sister group is the *atra* group (*piceocincta* group in Ross 1951) in which the spur on the penis valve is long and curved up (similar to Fig. 6).

Ecology.—The host is unknown. Adults have been recorded from about 500′ (Knowlton, Quebec) to 5200′ (Great Smoky Mts. Natl. Park, N.C./Tenn.) in deciduous forests. Flight dates are from May 21 to July 19. Twelve specimens were collected in the Fernow Experimental Forest in West Virginia from May 21 to July 19 with most collected in May and June. Specimens were rather uniformly distributed throughout the four study watersheds, with 3 specimens from watershed 1, 3 from watershed 4, 4 from watershed 7, and 2 from watershed 13. Five were from forest-edge traps. The seven specimens from within the forest were all from traps in valleys and northerly-facing slopes: traps 1, 1 specimen; traps 2, 4 specimens, and traps 3, 2 specimens.

Tenthredo masneri Goulet and Smith, New Species
(Figs. 2, 6, 8)

Diagnosis.—Adults are distinguished from those of other Nearctic species of *Tenthredo* with minute pulvilli (length of pulvillus on first metatarsomere, 0.20–0.30× length of second metatarsomere) and with microsculpture on the mesonotal median lobe by the following character combination: ventral portion of metasternum completely orange, clypeus white, and tergites 2–8 white along posterolateral margin.

Female.—Length, 11.5–12.5 mm. Antenna and head black; clypeus, labrum, basal ⅔ mandible, labium, and maxillary and labial palpi white; apical ⅓ mandible reddish; usually minute but occasionally large white spot on lower outer orbit and with minute white to brown spot on upper inner orbit. Thorax black with posterior corners and (in most specimens) ventral margin of pronotum, tegula, spot (may be as large as pale portion of mesepisternum above mesepisternal spine) on lower posterior corner of mesepisternum, and metepisternum white; mesosternum and most of mesepisternum orange (white or whitish orange in some specimens) except for broad black stripe on upper ⅓ or less of posterior margin of mesepisternum. Abdomen black; small white spot on lateral margin of tergite 1 extended along posterior margin, and tergites 2–8 each with narrow white band visible at least posterolaterally. Legs orange with extreme tip of meso- and metafemora, apical ⅓–½ metatibia, and metatarsus, black. Wings hyaline; veins and stigma black.

Head in dorsal view narrower behind eyes (maximal distance between outer margins of eyes 1.10× maximal distance between outer margins of gena). Antennal crest moderately elevated with weakly developed angular projection behind it. Antennal flagellum moderately long: sixth flagellomere about 3× longer than wide and first flagellomere 1.15–1.25× as long as second flagellomere. Malar area near mandible with convex sculpticells and fine punctures (10–15 μm in diameter); central portion of gena without microsculpture; remainder of head smooth. Mesepisternal spine obtusely angular (about 115°, Fig. 8). Most of thorax

with meshes of microsculpture and sculpticells flat, but central area in upper half of mesepisternum, mesoscutellum anteromedially, medial region of posttergite and mesonotal lateral lobe without microsculpture. Punctures on pectus and on mesoscutum fine (10–15 μm in diameter), 25–30 μm apart on median lobe and pectus, and 20–40 μm apart on lateral lobe; punctures of mesoscutellum larger (25–30 μm in diameter) and 25–50 μm apart. Abdomen shining but with fine surface sculpture: sculpticells about 15 μm in length by 15–60 μm in width, posterior margin of sculpticells clearly elevated and scale-like. Setae visible over most of tergite 1. Pubescence developed over all of tergite 7 and dense on tergites 8–9, 40–50 μm apart. Tarsal pulvilli minute (length of pulvillus of first metatarsomere 0.20–0.28× length of second metatarsomere) and narrow (width of pulvillus of first metatarsomere about ⅓ apical width of second metatarsomere) (as in Fig. 4). Serrulae of lancet as in Fig. 2.

Male.—Length, 9.0 mm. Antenna and head black; clypeus and mouthparts white with apex of mandible reddish; lower ⅓ of outer orbit from mandible and minute spot on upper inner orbit whitish. Thorax mostly black dorsally, with large spot on lower pronotum, posterior corner of pronotum, tegula, cervical sclerite, prosternum, central stripe on mesepisternum dorsal to angle, and metepisternum white; mesosternum to angle of mesepisternum pale orange. Abdomen mostly black above with tergites 2–5 to 2–7 yellowish orange at side gradually becoming darker toward dorsal surface; lateral margin of tergite 1 narrowly white; posterior margin of each segment narrowly whitish; mostly orange ventrally with apical 2–3 sternites black. Legs pale orange to yellow, fore- and midlegs more yellowish and hindleg more orange; upper surface of tip of each femur with black spot (may be lacking on profemur); metatibia brownish to dark orange; metatarsus black; outer surface of mesotibia and mesotarsus darker orange than inner surface. Wings hyaline; veins and stigma black with vein R apical to stigma, amber.

Head in dorsal view clearly narrower behind eyes (maximal distance between outer margins of eyes 1.20× maximal distance between outer margins of gena). Setae visible over most of tergite 1. Metatarsus in dorsal view wider than in female: metatarsomere 2 about 4× longer than wide. Genitalia as in Fig. 6; penis valve with long apical spine.

Holotype.—Female, labeled "QUE. Gatineau Pk, Luskville Falls, 5–22-VII-1988, J. Denis 300 m." Deposited in the Canadian National Collection, Ottawa, Ontario, Canada.

Paratypes (63 F, 5 M).—CANADA: NOVA SCOTIA: Cape Breton Highlands Natl. Park, 60°41′W–46°48′N (1F); Cape Breton Highlands Natl. Park, 60°44′W–46°48′N (1F). ONTARIO: 7 mi. E Griffith (1F); Finland (1F). QUEBEC: Mont Albert (1F); Park Reserve (1F); Portneuf Co., St.-Augustin (1F); Berthierville (1M); St. Hilaire (1F); Knowlton (1F); Ste. Agathe des Monts (1F); Mont Pinacle (1F); Montford (1F); Ste. Anne de Bellevue (1M, 3F); Rigaud (4F); King Mountain (summit) near Old Chelsea (2F); Gatineau Prov. Park, Luskville Falls (1F); Lac Roddick (1F). U.S.A.: MICHIGAN: Cheboygan Co. (1M). NEW HAMPSHIRE: Coos Co., First Connecticut Lake (1F). NEW YORK: Ithaca (1F); Ludlowville (1M). NORTH CAROLINA/TENNESSEE: Great Smoky Mts. Natl. Park, Indian Gap (1F). WEST VIRGINIA: Tucker Co., Fernow Expt. Forest, E. M. Barrows, 11–20-V-91, trap 7-3 (1F); 21-30-V-91, trap 4-3 (1F), trap 7-3 (2F), trap 13-2 (1F); 31-V–9-VI-91, trap 4-5 (1F), trap 13-4 (1F); 10–19-VI-91, trap 4-2 (1F), trap 4-6 (1M), trap 7-4 (1F), trap 13-1 (1F), trap 13-3 (2F); 20–29-VI-91, trap 1-1 (1F), trap 1-3 (1F), trap 4-1 (1F), trap 4-2 (1F), trap 7-3 (1F), trap 13-1 (1F), trap 13-3 (1F); 30-VI–9-VII-91, trap 1-1 (1F), trap 1-5 (3F), trap 13-4 (1F); 10–19-VII-91, trap 1-5 (1F),

trap 7-1 (1F); 30-VII–8-VIII-91, trap 7-1 (1F); 30-V–8-VI-92, trap 13-3 (1F); 9–18-VI-92, trap 4-5 (1F); 19–28-VI-92, trap 13-5 (1F); 8-VII-92, on leaf of maple near trap 7-4 (1F); 9–18-VII-91, trap 4-5 (1F); 19–28-VII-92, trap 4-3 (1F), trap 13-2 (1F); 29-VII–7-VIII-91, trap 13-2 (1F); 8–17-VIII-92, trap 1-5 (1F); 18–27-VIII-92, trap 13-5 (1F); 24 km E Richwood, (1F). Deposited with the holotype; National Museum of Natural History, Washington, D.C.; University of Montreal; Lyman Entomological Museum; and Carnegie Museum.

Distribution.—This species is recorded from northwestern Ontario near the Manitoba border to the Atlantic coast in Nova Scotia, and south along the Appalachian Mountains to Great Smoky Mountains National Park on the Tennessee-North Carolina border.

Etymology.—We name this elegant species in honor of Dr. Lubomir Masner, a dear colleague, who, through his unabated enthusiasm for field work, has provided us with numerous specimens and unusual species of sawflies. Dr. Masner also collected the northernmost record at the fringe of the boreal forest (Roddick Lake, Quebec).

Discussion.—Adults of *T. masneri* appear to resemble those of *T. rufopecta* and *T. mellicoxa* in the *rufopecta* group. However, *T. masneri* does not belong to this group, but is part of a very large lineage to which most North American species belong (see discussion under *T. appalachia*). Females of *T. masneri* are near perfect color matches of *T. rufopecta*. However, both sexes of *T. rufopecta* are differentiated from those of *T. masneri* by the following features: antennae partly brownish (usually the undersurface); clypeus entirely or partly black (at least with some black and not entirely white); approximately upper half of mesepisternum black; minute white spots on lower outer eye orbit and upper inner orbit lacking; pro- and mesotarsal segments ringed with black at their apices; and mesepisternal spine more obtuse (angle about 135°, Fig. 12). Both sexes of *T. mellicoxa* are differentiated from *T. masneri* by: a sharply defined white lateral stripe on the abdomen; posterior margins of abdominal segments narrowly but distinctly white; minute white spots on the upper inner orbit lacking; and the mesepisternal spine hardly suggested (rather flatly rounded without trace of an angle, Fig. 11). From *T. appalachia*, probably its nearest species, *T. masneri* is differentiated by the white posterior margin of the pronotum in dorsal view; white posterolateral margin of tergites 2–8; white posterior margin of tergite 1; lack of black at base of clypeus (except at side in some specimens); shorter flagellum (sixth flagellomere about 3× longer than wide); and presence of setae over at least base of tergite 1.

Ecology.—The host is unknown. Adults of the species have been recorded from sea level (Montreal, Quebec, region) to 5200′ (Great Smoky Mts. Natl. Park, N.C./Tenn.) mainly in deciduous forest habitats. Flight is recorded from May 11 to September 10. In the North (Ontario, Quebec, Nova Scotia and New England) most specimens were collected from mid-July to early August, but in the South (West Virginia) the peak flight is from mid-June to mid-July. Thirty-eight specimens were collected in the Fernow Experimental Forest in West Virginia. They appeared to be rather uniformly distributed throughout the study watersheds. Traps in watershed 1 yielded 8 specimens; watershed 4, 8 specimens; watershed 7, 7 specimens; and watershed 13, 13 specimens. Most specimens were collected from traps near streams and on the southerly-facing slopes. Traps 1 yielded 7 specimens; traps 2, 5 specimens; traps 3, 11 specimens; traps 4, 3 specimens; and traps 5, 10 specimens. In the two years of the study, the flight period was rather long, beginning May 11 and ending August 27. Most specimens were collected June 10–29, with numbers gradually decreasing to August.

Tenthredo fernowi Goulet and Smith, New Species
(Figs. 3, 7, 10)

Diagnosis.—Adults are distinguished from those of other Nearctic species of *Tenthredo* with very small metatarsal pulvilli (length of pulvillus on first metatarsomere 0.15–0.20× length of second metatarsomere), and without meshes of microsculpture on dorsal surface of head, mesonotal median lobe, and mesepisternum (including pectus) by the following character combination: clypeus black with sublateral white spots in female; tergites 2 and 3 orange and remaining tergites black; and mesepisternum (including pectus) black with white spot near mesocoxa or with stripe from mesocoxa to about middle of mesepisternum anteriorly.

Female.—Length, 10.5–12.0 mm. Antenna and head black; clypeus mostly white laterally, black centrally; labrum, basal ⅔ of mandible, labium, and maxillary and labial palpi white; apical ⅓ of mandible reddish. Thorax black with posterior corner of pronotum, tegula, short stripe or spot on lower posterior corner of mesepisternum, and metepisternum white. Abdomen black with small white spot on lateral margin of tergite 1 and 2nd and 3rd segments and anterior ⅓–½ of 4th sternite orange. Legs orange with extreme tip of meso- and metafemora, extreme apex of mesotibia, apical ¼ of metatibia, and metatarsus black; apical ⅓ of mesotarsal segments usually blackish; basal ¼–⅓ of first metatarsomere orange. Wings hyaline; veins and stigma black with costa and vein R apical to stigma, amber.

Head except near mandible, mesoscutum, mesoscutellum (except at side), mesepisternum, pectus (except on outer half in some specimens), mesoscutellar appendage (except at side) and metascutellum without meshes of microsculpture, thus surface of these structures very bright. Gena near mandible with deeply impressed meshes of microsculpture and convex sculpticells, and with some very fine punctures (about 15 μm in diameter). Punctures on mesoscutum 10–15 μm in diameter; slightly denser on median lobe (50–75 μm apart) than on lateral lobe (40–100 μm apart); on mesoscutellum coarse (20–25 μm in diameter) and 50–100 μm apart. Mesoscutellar appendage with fewer than 8 punctures. Mesepisternum slightly extended outward and rounded without distinct medial angle (Fig. 10). Metascutellum with fewer than 10 setae. Tergites 2–8 with meshes of microsculpture variably transverse (length about 10 μm and width 15–60 μm); sculpticells flat and very slightly raised along posterior margin and scale like. Tarsal pulvilli minute, short (length of pulvillus of first metatarsomere 0.18–0.20× length of second metatarsomere) and narrow (width of pulvillus of first metatarsomere about ⅓ apical width of second metatarsomere) (as in Fig. 4). Serrulae of lancet as in Fig. 3.

Male.—Length, 9.0–9.5 mm. Similar in coloration to female except clypeus white or with slight indication of black medially, no white spot laterally on tergite 1, 2nd and 3rd abdominal segments sometimes blackish laterally, and apical ⅓ or more of metatibia black. Second metatarsomere in dorsal view not widened, similar to female, about 5–6× longer than wide. Genitalia as in Fig. 7; penis valve without apical spine.

Holotype.—Female, labeled "WEST VIRGINIA: Tucker Co., Fernow Expt. Forest, 31-V–9-VI-1991, E.M. Barrows" "Malaise trap 4-2." Deposited in the National Museum of Natural History, Washington, D.C.

Paratypes (97 F, 5 M).—U.S.A.: MARYLAND: Prince Georges Co., Patuxent Wildlife Center, 6–10-VII-90 (1F); Montgomery Co., Plummers Island, 24-V-75 (1F). NORTH CAROLINA: Great Smoky Mts. Natl. Park, 4-VII-62 (1F). VIRGINIA: Fairfax Co., near Annandale, Malaise trap, 27-V–3-VI-84 (1F); Falls Church, 24-VI-16 (1F), 1-VI (1M); Giles Co., Cold Spring, Va. Hwy 700 14-VI-75 (1F); Loudoun Co.,

Bluemont, 6-V-13 (1F); Clarke Co., Univ. Va. Blandy Exp. Farm, 2 mi S Boyce, 19–30-IV-90, trap 8 (2F), 1-13-V-90, traps 8, 9 (3F), 14–24-V-90, trap 8 (2F); Shenandoah Co., Mount Jackson, 25-V-62 (1F); Shenandoah Co., Shenandoah Natl. Park, Compton Gap, 22-V–2-VI, 87 (1F); Shenandoah Co., Shenandoah Natl. Park, Big Meadows, 14-VI-82 (1F). WEST VIRGINIA: Same data as holotype, except for dates and trap numbers: 21–30-V-91, trap 1-4 (1F), trap 4-1 (1F), trap 4-4 (1F), trap 7-1 (3F), trap 7-2 (1F), trap 7-3 (1F), trap 7-4 (2F), trap 13-3 (2F), trap 13-4 (1F); 31-V–9-VI-91, trap 1-4 (1F), trap 1-5 (1F), trap 4-3 (1F), trap 4-4 (1F), trap 4-6 (1F), trap 7-2 (1F), trap 7-3 (2F), trap 7-6 (1F), trap 13-3 (1F), trap 13-4 (2F); 10–19-VI-91, trap 1-2 (2F), trap 4-1 (1F), trap 4-3 (1F), trap 4-6 (1F), trap 7-3 (1F), trap 7-6 (1F); 20–29-VI-91, trap 1-1 (1F), trap 4-2 (1F), trap 4-3 (1F), trap 7-3 (1F), trap 13-4 (1F); 30-VI–9-VII-91, trap 1-1 (1F), trap 4-3 (1F); 10–19-V-92, trap 1-1 (1F); 20–29-V-92, trap 1-2 (1F), trap 4-1 (1F), trap 4-2 (1F, 1M), trap 4-3 (2F), trap 7-3 (1F, 2M), trap 13-2 (1F), trap 13-4 (1M), trap 13-6 (1F); 30-V–8-VI-92, trap 4-3 (2F), trap 7-2 (1F); 9–18-VI-92, trap 1-1 (1F), trap 1-2 (1F), trap 4-3 (1F), trap 4-4 (1F), trap 7-3 (1F), trap 7-5 (1F), trap 13-3 (1F); 19–28-VI-92, trap 1-3 (1F), trap 4-2 (2F), trap 4-3 (2F), trap 13-4 (1F); 29-VI–8-VII-92, trap 4-1 (3F), trap 4-3 (1F), trap 7-1 (1F), trap 13-4 (1F); 9–18-VII-92, trap 1-1 (1F), trap 4-1 (2F), trap 4-2 (1F), trap 7-1 (1F), trap 7-4 (1F), trap 13-3 (1F), trap 13-4 (1F); Cranberry Glades, 3–4-VI-55 (2F). Deposited with the holotype; Museum of Comparative Zoology; Florida State Collection of Arthropods; Snow Entomological Museum; and the Canadian National Collection, Ottawa.

Distribution.—This species is recorded from Maryland, Virginia, West Virginia, and North Carolina.

Etymology.—This species is named for Bernhard E. Fernow, a German-born forester who pioneered scientific forestry in the United States (Anonymous 1987). The Fernow Experimental Forest, the type locality and area from which most of the type material was collected, was named in his honor.

Discussion.—*Tenthredo fernowi* is a slender species with very small pulvilli (similar to Fig. 4). The orange color of the second and third abdominal segments, white spot laterally on the clypeus of the female, and mostly orange legs is a color combination not known in other North American *Tenthredo*. The clypeus of the male may be mostly white, but lack of meshes of microsculpture on the head, mesepisternum, pectus, and mesonotal median lobe will aid in its separation.

Coloration is rather stable, but a few minor variations occur. The white area at the lower posterior portion of the mesepisternum may vary from a small spot to a stripe extending anteriorly for about half the length of the mesepisternum; the third abdominal segment may be all orange or slightly blackish posteriorly; the fourth sternite may be all black to mostly orange; and the lateral white spots on the clypeus may be large or small in the female and the clypeus mostly or all white sometimes with a medial blackish area in the male.

Based on Ross' (1951) classification, *T. fernowi* would belong in the *rufopecta* group. Ross created groups for the Nearctic species of the genus in the 1951 Hymenoptera Catalog, but, to our knowledge, did not characterize them elsewhere. A study in progress by the senior author based on numerous structures in both sexes does not support some of the species associated with the *rufopecta* group. *Tenthredo repleta* MacGillivray (type not studied yet) is, if correctly interpreted, a member of the *grandis* group (median lobe of mesoscutum clearly with microsculpture, mesepisternum densely punctate, antennal flagellum flattened and apical joints white), and *T. rurigena* is more closely allied to Ross' *secunda* or *semirufa* groups (metatibial spurs less sharp than me-

sotibial ones, male penis valve with ventro-apical short and straight spine). This leaves *T. rufopecta* and *T. mellicoxa* in the *rufopecta* group. In North America, the *rufopecta* group is nearest to species related to *T. grandis* (Norton) (not Ross' *grandis* group, excluding *T. colon* Klug) and *T. ruma* MacGillivray. However, the *rufopecta* group appears nearest to Euroasiatic lineages. The *rufopecta* group is characterized as follows: microsculpture lacking (no traces of meshes) on dorsal surface of head and mesonotal median lobe; pulvilli very small (length of pulvillus of first metatarsomere 0.15–0.20 length of second metatarsomere) and narrow (width of pulvillus on first metatarsomere about one-third that of second metatarsomere); at least tergites 6–10 completely or almost completely pubescent in female; penis valve without ventro-apical spine; metatibial spurs as sharp as those of mesotibia; antennal crest developed but low, hardly or not angularly produced between level of median ocellus and antennal socket; and at least mesotarsomeres 1–4 darkened on apical 0.20–0.40 (thus ringed with brown or black at apex).

Except for color characters the above definition applies closely to some species in Eurasia such as *T. hilalis* Smith. In North America, the group as here defined consists of above three species and *T. nimbipennis*. Within this group, *T. fernowi* is nearest to *T. rufopecta*. Adults of *T. fernowi* share the following derived character states with *T. rufopecta*: first flagellomere barely longer than second; mesepisternum and pectus smooth (shared also with *T. nimbipennis*); clypeus with white spots sublaterally (shared also with *T. nimbipennis*); and complete lack of angular projection between antennal crest and level of median ocellus. Adults of *T. fernowi* are unusual in that the mesepisternal spine is hardly suggested and that the first metatarsomere of the male is not widened. In these two features, adults of *T. fernowi* match those of the Eurasian species, *T. hilalis*.

Ecology.—The host is unknown. Adults of this species have been recorded from sea level (Patuxent, Maryland) to 4200′ (Great Smokies Mts. Natl. Park, N.C./Tenn.) in broadleaf forests. Flight is recorded from April 19 to July 18. Most specimens were collected from mid-May to mid-June and were still common until mid-July. Eighty-three specimens were taken in traps in the Fernow Experimental Forest in West Virginia in 1991 and 1992. This was the most commonly collected species of *Tenthredo* in the forest. The species appeared to be uniformly distributed throughout the study watersheds. Five of the specimens were taken from forest-edge traps. Traps in watershed 1 yielded 13 specimens; watershed 4, 30 specimens; watershed 7, 21 specimens; and watershed 13, 14 specimens. Among the traps within the watersheds, traps 1 yielded 18 specimens; traps 2, 15 specimens; traps 3, 27 specimens; traps 4, 16 specimens; and traps 5, 2 specimens. Adults appeared to be most common in the valleys and on the northerly-facing or shaded slopes. They were least common in the high traps on the south-facing slopes. Flight period for the two years combined was from May 10 to July 19 (Fig. 13). Most specimens were collected May 21–30 with numbers steadily decreasing to July.

Specimens collected at the University of Virginia Blandy Experimental Farm, Clarke Co., Va., were all from one trap which was within a dense 85-year-old, oak-elm-hickory woodlot. After three years of collecting in the same general area in other habitats, no additional specimens were obtained. Thus, this species appears to be associated with the dense broadleaf forests.

Dolerus (*Achaetoprion*) *klokeorum* Goulet and Smith, New Species
(Fig. 14)

Diagnosis.—Females are distinguished from other Nearctic species of *Dolerus* by the following combination of character states: punctures of mesepisternum large (100–150 μm in diameter); mesonotum

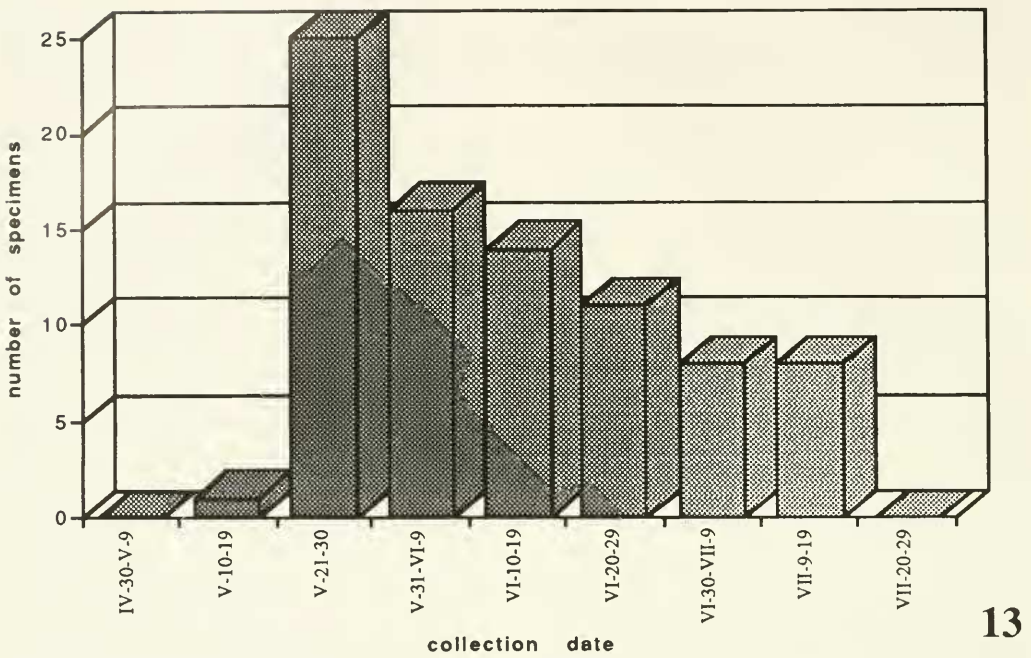


Fig. 13. Flight period for *Tenthredo fernowi*, Fernow Experimental Forest, West Virginia, 1991–1992. Number of specimens captured per collection date.

black only on lateral lobes; abdomen and base of sheath (valvifer 1 and 2) completely orange; and wings uniformly lightly infuscated.

Female.—Length, 7.5–8.5 mm. Antenna, head, and mouthparts black. Thorax orange with mesosternum, lower ¼–⅓ of mesepisternum, and most of mesonotal lateral lobes except posterior corners black. Abdomen orange with cercus black and apical segment (valvula 3) of sheath black laterally. Legs black. Wings moderately, uniformly infuscated; veins and stigma black.

Surface microsculpture generally lacking except on outer half of pectus, head (between punctures dorsally), side of tergites 7–9, last segment of sheath (valvula 3), coxae, and femora where flat sculpticells are outlined. Clypeal emargination deep, subequal to medial length of clypeus. Punctures on postocular area on both sides of postocellar region as far as upper ⅓ of gena densely punctate (a little less so near postocellar region) and about 80 μm in diameter. Punctures on mesepisternum large (100–150 μm in diameter) and on pectus very small (20 μm in diameter) and 30–80 μm apart except on oblique furrow (about 50 μm in diameter). Mesonotal lateral lobe without large punctures laterally. Mesoscutellar appendage about 175 μm in length medially. Distance between cenchri about 1.3× width of a cenchrus. Setae of mesepisternum about 100 μm in length. Cercus about 3× wider than long. Sheath in posterior view widely concave, in dorsal view with longest setae regularly curved, forming an angle of about 10°; ventral margin of last segment of sheath (valvula 3) regularly curved and forming an angle of about 45° with dorsal margin. Lancet as in Fig. 14; annuli each with one small spine and without seta-like sculpticells; serrulae except basal two, each with 4 or 5 coarse posterior subbasal teeth.

Male.—Unknown.

Holotype.—Female, labeled "VIRGINIA: Louisa Co., 4 mi. S. Cuckoo, 12–25-IV-88, J. Kloke & D.R. Smith, Malaise trap."

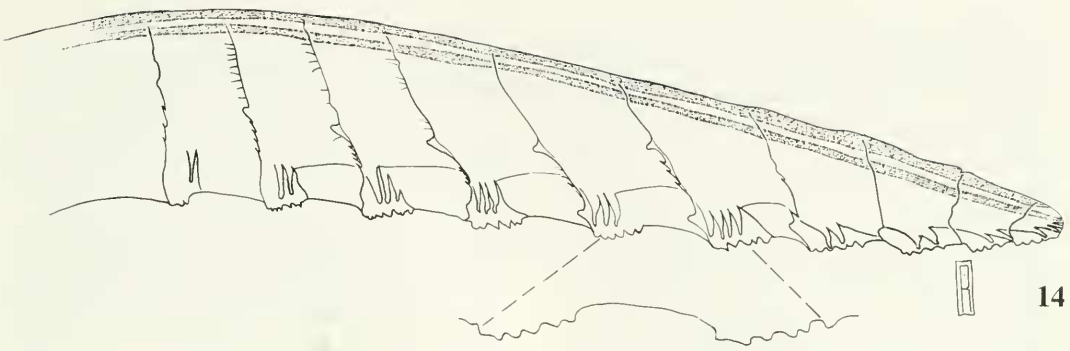


Fig. 14. Female lancet of *Dolerus klokeorum*.

Deposited in the National Museum of Natural History, Washington, D.C.

Paratypes (4 F).—U.S.A.: VIRGINIA: Same locality as holotype, 29-III–11-IV-88 (1F), 5–25-IV-89 (1F); Essex Co., 1 mi SE Dunnsville, 12–29-IV-91, David R. Smith, Malaise trap 10 (1F); Fairfax Co., Springfield, 29-IV-1973 (1F). Deposited with the holotype and in the Canadian National Collection, Ottawa.

Distribution.—Known only from Virginia.

Etymology.—This species is named for Jack and Beth Kloke, who have kindly allowed the junior author access to their properties in Virginia for field work.

Discussion.—Females of this species resemble those species of *Achaetoprion* with large punctures on mesepisternum (couplets 1–4 of Goulet's 1986 key), especially those of the *Dolerus abdominalis* (Norton) and *D. eurybis* Ross lineage defined by the following shared derived character states: clypeus deeply emarginate (shallowly emarginate in other *Achaetoprion* and most Dolerini) and punctures large on mesepisternum (small in other *Achaetoprion* except *D. versus* Norton). Females of *D. eurybis* are especially similar to *D. klokeorum* in color, but *D. eurybis* has the basal half of the wings deeply infuscated and the apical half hyaline; the longest setae of the sheath in dorsal view regularly curved and directed posteriorly (at about 10°); and broad, laterally projecting winglike processes on the annuli of the apical half of the lancet. *Dolerus abdominalis* has the thorax entirely black, except sometimes the metapleuron, the sheath entirely black with apex convex, and broad, laterally projecting winglike processes on the annuli of the apical half of the lancet. Despite similarities of the above external character states with other species, there is a major difference in the ovipositor structure. In *D. klokeorum* each annulus of the lancet has a spurlike process, while in *D. eurybis* and *D. abdominalis* it consists of a winglike process on the apical annuli. If this very unusual winglike process on the apical annuli of the lancet is derived (see Goulet 1986, figures 47 and 321, notes on affinities, p. 88), then *D. abdominalis* and *D. eurybis* would not be closely related to *D. klokeorum* which has only a spurlike process on the annuli as in *D. nortoni* Ross, *D. mimus* Goulet, *D. tacoma* Goulet, and *D. neoagcistus* MacGillivray (see Goulet 1986, figures 310, 312, 314 and 317). The spurlike process represents an earlier stage leading to the evolution of the winglike process. The relationship of species with a spurlike process on the annuli is unresolved. It is unlikely that winglike processes of the type described in Goulet (1986) would evolve independently. Thus, the similarities in external characters noted above between *D. klokeorum* and *D. eurybis* and *D. abdominalis* may be convergent.

Ecology.—Specimens were from traps in lowlands next to streams or drainages, areas frequently flooded during heavy rainfall. Trap 10 in Essex Co. traversed a small intermittent stream in a woodlot; the stream bed was moist in early spring but dry most of the summer. This species may feed on grasses or sedges in such stream beds or other similar seepage areas. *Equisetum,* a common host for other groups of *Dolerus,* was not present in these habitats. The five females were collected from March 29 to April 29.

Acknowledgments

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